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**Notes:**

1. Untranslatable words are replaced with asterisks (\*).
2. Texts in the figures are not translated and shown as it is.

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## FULL CONTENTS

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**[Claim(s)]**

[Claim 1] It is the method of combining two or more tabular format data expressed as an array of the record with which each includes an item and the item value included in this. The value list with which the item value concerned is stored in each tabular format data in order of the item value number corresponding to the item value to which each belongs to a specific item, Constitute so that it may divide into one or more information blocks which consist of pointer arrays in which the pointer value for directing the item value number concerned was stored in order of the unique record number, and among two or more tabular format data Find out an equivalent item, specify the information block about said equivalent item, and it sets to each of two or more of said tabular format data. In the information block to which the item value was added when comparing the value list included in said specified information block, making the value list of both equivalent and making said value list equivalent The joint method characterized by combining tabular format data in said two or more tabular format data when [ the value list included in the information block about a specific item ] adding the pointer value of a related pointer array and it is equivalent.

[Claim 2] The data coupling method according to claim 1 characterized by holding only a single value list actually about the information block equipped with said value list which became equivalent.

[Claim 3] By the joint method indicated to Claim 1 or 2, the value list included in the information block about a specific item prepares two or more tabular format data which became equivalent, and is related with said two or more tabular format data. The information block about the key item which the pointer value of a pointer array does not overlap among the information blocks about said specific item is specified. Determine tabular format data equipped with the information block concerned as sub tabular format data, and it is set to which information block. In order of a value list item value, the 2nd pointer array which specifies the record

number of said sub tabular format data is generated. The information block about the item which should be shown among the information blocks contained in said two or more tabular format data is specified. It is related with the information block which constitutes the main tabular format data which is tabular format data other than said sub tabular format data among the information blocks about said item which should be shown. With reference to the pointer value under pointer array corresponding to a predetermined record number, acquire a predetermined item value and the record number corresponding to said predetermined record number is referred to about the information block which constitutes said sub tabular format among the information blocks about said item which should be shown. In the information block which specifies the record number about the sub tabular format under 2nd [ said ] corresponding pointer array, and constitutes said sub tabular format data The presentation method of the combined tabular format data which is characterized by showing the item value which acquired and acquired the predetermined item value with reference to the pointer value under pointer array corresponding to the record number about the sub tabular format data concerned.

[Claim 4] In order of the value list item value included in the information block about said key item at the information block concerned In the information block which generates the 2nd pointer array in which the pointer value for directing a record number was stored, and constitutes sub tabular format data among the information blocks about said item which should be shown In the information block which specifies the record number about the sub tabular format data under 2nd corresponding pointer array with reference to the pointer value under pointer array corresponding to said predetermined record number, and constitutes the sub tabular format data concerned The presentation method of the tabular format data according to claim 3 characterized by acquiring a predetermined item value by referring to the pointer value under pointer array corresponding to the record number under 2nd pointer array concerned.

[Claim 5] [ are the information block which constitutes said main tabular format data, and / the value list ] in the information block which became equivalent The 2nd pointer array in which the pointer value for directing the record number of said sub tabular format data was stored in order of the value list item value is generated. The record number about the sub tabular format data under said 2nd pointer array corresponding to said predetermined record number is specified. In the information block which constitutes said sub tabular format data among the information blocks about said item which should be shown The presentation method of the tabular format data according to claim 3 characterized by acquiring a predetermined item value with reference to the pointer value under pointer array corresponding to the record number about said sub tabular format data.

[Claim 6] [ the information block about the item which should be shown at least among the information blocks which constitute said sub tabular format data ] The 2nd pointer array in

which the pointer value for directing the record number of the sub tabular format data concerned was stored in order of the value list item value is generated. In the information block which constitutes sub tabular format data among the information blocks about said item which should be shown in the information block which specifies the record number about the sub tabular format data under 2nd corresponding pointer array with reference to the pointer value under pointer array corresponding to said predetermined record number, and constitutes the sub tabular format data concerned. The presentation method of the tabular format data according to claim 3 characterized by acquiring a predetermined item value by referring to the pointer value under pointer array corresponding to the record number under 2nd pointer array concerned.

[Claim 7] [ furthermore, the information block which should sort the item value according to predetermined sequence ] The presence number array which stores the presence number which shows the number of the record about main tabular format data corresponding to an item value is generated. According to said presence number array, the position directions array which shows the initial value of a position which stores the record number about said main tabular format data is generated. While arranging the record number of said main tabular format data according to the position directions array of the position shown with corresponding pointer value The sorting array which the record number of main tabular format data was sorted, and was stored by incrementing the value to which the position directions array concerned corresponds is generated. The presentation method of Claim 3 characterized by acquiring a required item value in order of the record number stored in said sorting array, and showing the item value sorted based on the key item concerned, or tabular format data given in any 1 clause of 6.

[Claim 8] [ the presence number which shows the number of the pointer value under pointer array of the information block which is an information block which constitutes main tabular format data, and has a value list equivalent to the information block concerned in the information block about a key item ] The presentation method of the tabular format data according to claim 7 characterized by generating the presence number array stored according to the order of the value list of [ in the information block of the key item concerned ].

[Claim 9] The pointer array in the information block which constitutes main tabular format data equivalent to the information block about a key item, The presentation method of the tabular format data according to claim 7 characterized by generating the presence number array which stores the presence number which shows the number of the records about main tabular format data in the information block which should sort said item value using said 2nd pointer array.

[Claim 10] By the joint method indicated to Claim 1 or 2, the value list included in the information block about a specific item prepares two or more tabular format data which became equivalent, and is related with said two or more tabular format data. The tabular

format data with which a default sort order is reflected among the information blocks about said specific item in the case of presentation is determined as main table formal data. It is the information block which determines the other tabular format data as \*\*\*\*\* data, and constitutes said \*\*\*\*\* data. [ the presence number which shows the number of the record about \*\*\*\*\* data to the information block from which the item value became equivalent ] Generate the 1st presence number array stored corresponding to an item value, and said 1st presence number array is followed. The 1st position directions array which determines the initial position arranged where the record number of said \*\*\*\*\* data is sorted is generated. While arranging the record number of said \*\*\*\*\* data according to the 1st position directions array of the position shown with corresponding pointer value By incrementing the value to which the position directions array concerned corresponds, the record number of \*\*\*\*\* data generates the 1st sorting array sorted and stored, and it The initial value and the final value of said position directions array, The pointer array in the information block it became equivalent about said main table formal data the value listing is referred to. Compute the multiplicity of the pointer array of other information blocks about said main table formal data, extend a pointer array according to the multiplicity concerned, and The initial value and the final value of said position directions array, With reference to said sorting array, the multiplicity of the pointer array of the information block about said \*\*\*\*\* data is referred to. The presentation method of the tabular format data characterized by extending a pointer array according to the multiplicity concerned, and acquiring and showing a required item value based on the extended pointer array concerned.

[Claim 11] Based on said multiplicity, the record number of main table formal data generates the 1st conversion array arranged by overlapping, and is related with said main table formal data. The presentation method of the tabular format data according to claim 10 characterized by taking out a value list item value with reference to the pointer array to the value list of information blocks according to said 1st conversion array.

[Claim 12] Based on said multiplicity relevant to the record number of said main table formal data, the record number of \*\*\*\*\* data generates the 2nd conversion array arranged by overlapping, and is related with said \*\*\*\*\* data. The presentation method of the tabular format data according to claim 10 or 11 characterized by taking out a value list item value with reference to the pointer array to the value list of information blocks according to said 2nd conversion array.

[Claim 13] By the joint method indicated to Claim 1 or 2, the value list included in the information block about two or more specific items prepares two or more tabular format data which became respectively equivalent, and is related with said two or more tabular format data. Tabular format data including the item in which a default sort order is reflected among the information blocks about said specific item in the case of presentation is determined as main

table formal data. Determine the other tabular format data as \*\*\*\*\* data, and it is related with said main table formal data. Generate the pointer array to the value list of imagination which is the set intersections of two or more value lists which became equivalent, and it is related with said \*\*\*\*\* data. Generate the 2nd pointer array to the value list of said imagination, and in order of the value list item value of said imagination The 3rd pointer array which specifies the record number of said \*\*\*\*\* data is created. Specify the information block about the item which should be shown among the information blocks contained in said two or more tabular format data, and it is related with the information block which constitutes tabular format data among the information blocks about said item which should be shown. The inside of the information block with reference to the pointer value under pointer array corresponding to a predetermined record number, acquire a predetermined item value, and concerning said item which should be shown, The record number corresponding to said predetermined record number is referred to about the information block which constitutes said sub tabular format. In the information block which specifies the record number of said \*\*\*\*\* data under said 3rd pointer array, and constitutes said \*\*\*\*\* data based on the pointer value under pointer array to the corresponding value list of said imagination The presentation method of the combined tabular format data which is characterized by showing the item value which acquired and acquired the predetermined item value with reference to the pointer value under pointer array corresponding to the record number about the \*\*\*\*\* data concerned.

[Claim 14] The number of the information blocks which have said value list which became equivalent is two, and are related with one information block. The number of the value list item values which became equivalent is p, and are related with the information block of another side. [ the pointer value  $Pm_i$  ( $0 \leq j \leq p-1$ ) to the value list of said imagination about said main table formal data ] when the number of the value list item values which became equivalent is q  $Pm_i = Pm_1 i * q + Pm_2 i$  (however, [  $Pm_1 i$  ]) [ the value list item value about one information block, and  $Pm_2 i$  ] [ it is expressed the value list item value about the information block of another side, and ] The pointer value  $Ps_j$  ( $0 \leq j \leq p-1$ ) to the value list of said imagination about said \*\*\*\*\* data is  $Ps_j = Ps_1 j * q + Ps_2 j$  (however, [  $Ps_1 j$  ]). The value list item value about one information block and  $Ps_2 j$  are the presentation methods of the tabular format data according to claim 13 characterized by being expressed the value list item value about the information block of another side.

[Claim 15] By the joint method indicated to Claim 1 or 2, the value list included in the information block about two or more specific items prepares two or more tabular format data which became respectively equivalent, and is related with said two or more tabular format data. Tabular format data including the item in which a default sort order is reflected among the information blocks about said specific item in the case of presentation is determined as main table formal data. Determine the other tabular format data as \*\*\*\*\* data, and it is related with

each of said main table formal data and main table format record. By sorting said record number in items other than the item in which a default sort order is reflected, and sorting said record number in the item in which the above-mentioned sort order is finally reflected Generate the 1st sorting array and the record number under said 1st sorting array is referred to. The item value to which two or more value lists about said two or more items correspond is taken out, respectively. Store the multidimensional array of the taken-out item value in the corresponding position under multi-dimension value list equipped with the item value which consists of a multidimensional array of two or more item values, and said record number is stored in the position corresponding to said record number of the pointer array for specifying the multidimensional array of said multi-dimension value list. In which information block, the 2nd pointer array which specifies the record number of said \*\*\*\*\* data is generated in order of a value list item value. It is related with the information block which constitutes said main table formal data among the information blocks about said item which should be shown. The pointer value of the pointer array for specifying the multi-dimension value list corresponding to a predetermined record number, and/ Or with reference to the pointer value of other pointer arrays, acquire a predetermined item value and it is related with the information block which constitutes said \*\*\*\*\* among the information blocks about said item which should be shown. In the information block which specifies the record number about \*\*\*\*\* under 2nd [ said ] corresponding pointer array with reference to the record number corresponding to said predetermined record number, and constitutes said sub tabular format data The presentation method of the tabular format data characterized by showing the item value which acquired and acquired the predetermined item value with reference to the pointer value of the pointer array for specifying the multi-dimension value list corresponding to the record number about the \*\*\*\*\* data concerned, and/or the pointer value under pointer array.

[Claim 16] It is the storage which memorized the program which can be executed in a computer system for the method of combining two or more tabular format data expressed as an array of the record with which each includes an item and the item value included in this. The value list with which the item value concerned is stored in each tabular format data in order of the item value number corresponding to the item value to which each belongs to a specific item, Constitute so that it may divide into one or more information blocks which consist of pointer arrays in which the pointer value for directing the item value number concerned was stored in order of the unique record number, and among two or more tabular format data Find out an equivalent item, specify the information block about said equivalent item, and it sets to each of two or more of said tabular format data. In the information block to which the item value was added when comparing the value list included in said specified information block, making the value list of both equivalent and making said value list equivalent The storage which memorized the program characterized by combining tabular format data in said two or

more tabular format data when [ the value list included in the information block about a specific item ] adding the pointer value of a related pointer array and it is equivalent.

[Claim 17] It is based on two or more tabular format data it became equivalent value listing [ which is included in the information block about a specific item by the joint method based on the program indicated to Claim 16 ]. Are the storage which memorized the program which can be executed in a computer system, and the method of showing the item value about a specific item is related with said two or more tabular format data. The information block about the key item which the pointer value of a pointer array does not overlap among the information blocks about said specific item is specified. Determine tabular format data equipped with the information block concerned as sub tabular format data, and it is set to which information block. In order of a value list item value, the 2nd pointer array which specifies the record number of said sub tabular format data is generated. The information block about the item which should be shown among the information blocks contained in said two or more tabular format data is specified. It is related with the information block which constitutes the main tabular format data which is tabular format data other than said sub tabular format data among the information blocks about said item which should be shown. The inside of the information block with reference to the pointer value under pointer array corresponding to a predetermined record number, acquire a predetermined item value, and concerning said item which should be shown, The record number corresponding to said predetermined record number is referred to about the information block which constitutes said sub tabular format. In the information block which specifies the record number about the sub tabular format under 2nd [ said ] corresponding pointer array, and constitutes said sub tabular format data The storage which memorized the program characterized by showing the item value which acquired and acquired the predetermined item value with reference to the pointer value under pointer array corresponding to the record number about the sub tabular format data concerned.

[Claim 18] In order of the value list item value included in the information block about said key item at the information block concerned In the information block which generates the 2nd pointer array in which the pointer value for directing a record number was stored, and constitutes sub tabular format data among the information blocks about said item which should be shown In the information block which specifies the record number about the sub tabular format data under 2nd corresponding pointer array with reference to the pointer value under pointer array corresponding to said predetermined record number, and constitutes the sub tabular format data concerned The storage which memorized the program according to claim 17 characterized by acquiring a predetermined item value by referring to the pointer value under pointer array corresponding to the record number under 2nd pointer array concerned.

[Claim 19] [ are the information block which constitutes said main tabular format data, and / the value list ] in the information block which became equivalent The 2nd pointer array in which the

pointer value for directing the record number of said sub tabular format data was stored in order of the value list item value is generated. The record number about the sub tabular format data under said 2nd pointer array corresponding to said predetermined record number is specified. In the information block which constitutes said sub tabular format data among the information blocks about said item which should be shown The storage which memorized the program according to claim 17 characterized by acquiring a predetermined item value with reference to the pointer value under pointer array corresponding to the record number about said sub tabular format data.

[Claim 20] [ the information block about the item which should be shown at least among the information blocks which constitute said sub tabular format data ] The 2nd pointer array in which the pointer value for directing the record number of the sub tabular format data concerned was stored in order of the value list item value is generated. In the information block which constitutes sub tabular format data among the information blocks about said item which should be shown In the information block which specifies the record number about the sub tabular format data under 2nd corresponding pointer array with reference to the pointer value under pointer array corresponding to said predetermined record number, and constitutes the sub tabular format data concerned The storage which memorized the program according to claim 17 characterized by acquiring a predetermined item value by referring to the pointer value under pointer array corresponding to the record number under 2nd pointer array concerned.

[Claim 21] [ furthermore, the information block which should sort the item value according to predetermined sequence ] The presence number array which stores the presence number which shows the number of the record about main tabular format data corresponding to an item value is generated. According to said presence number array, the position directions array which shows the initial value of a position which stores the record number about said main tabular format data is generated. While arranging the record number of said main tabular format data according to the position directions array of the position shown with corresponding pointer value The sorting array which the record number of main tabular format data was sorted, and was stored by incrementing the value to which the position directions array concerned corresponds is generated. The storage which memorized the program of the description in Claim 18 characterized by acquiring a required item value in order of the record number stored in said sorting array, and showing the item value sorted based on the key item concerned, or any 1 clause of 20.

[Claim 22] [ the presence number which shows the number of the pointer value under pointer array of the information block which is an information block which constitutes main tabular format data, and has a value list equivalent to the information block concerned in the information block about a key item ] The storage which memorized the program according to

claim 21 characterized by generating the presence number array stored according to the order of the value list of [ in the information block of the key item concerned ].

[Claim 23] The pointer array in the information block which constitutes main tabular format data equivalent to the information block about a key item, The storage which memorized the program according to claim 21 characterized by generating the presence number array which stores the presence number which shows the number of the records about main tabular format data in the information block which should sort said item value using said 2nd pointer array.

[Claim 24] It is based on two or more tabular format data it became equivalent value listing [ which is included in the information block about a specific item by the joint method based on the program indicated to Claim 16 ]. Are the storage which memorized the program which can be executed in a computer system, and the method of showing the item value about a specific item is related with said two or more tabular format data. The tabular format data with which a default sort order is reflected among the information blocks about said specific item in the case of presentation is determined as main table formal data. It is the information block which determines the other tabular format data as \*\*\*\*\* data, and constitutes said \*\*\*\*\* data.

[ the presence number which shows the number of the record about \*\*\*\*\* data to the information block from which the item value became equivalent ] Generate the 1st presence number array stored corresponding to an item value, and said 1st presence number array is followed. The 1st position directions array which determines the initial position arranged where the record number of said \*\*\*\*\* data is sorted is generated. By incrementing the value to which the position directions array concerned corresponds, while arranging the record number of said \*\*\*\*\* data according to the 1st position directions array of the position shown with corresponding pointer value The record number of \*\*\*\*\* data generates the 1st sorting array sorted and stored, and it The initial value and the final value of said position directions array, The pointer array in the information block it became equivalent about said main table formal data the value listing is referred to. Compute the multiplicity of the pointer array of other information blocks about said main table formal data, extend a pointer array according to the multiplicity concerned, and The initial value and the final value of said position directions array, With reference to said sorting array, the multiplicity of the pointer array of the information block about said \*\*\*\*\* data is referred to. The storage which memorized the program characterized by extending a pointer array according to the multiplicity concerned, and acquiring and showing a required item value based on the extended pointer array concerned.

[Claim 25] Based on said multiplicity, the record number of main table formal data generates the 1st conversion array arranged by overlapping, and is related with said main table formal data. The storage which memorized the program according to claim 24 characterized by taking out a value list item value with reference to the pointer array to the value list of information blocks according to said 1st conversion array.

[Claim 26] Based on said multiplicity relevant to the record number of said main table formal data, the record number of \*\*\*\*\* data generates the 2nd conversion array arranged by overlapping, and is related with said \*\*\*\*\* data. The storage which memorized the program according to claim 24 or 25 characterized by taking out a value list item value with reference to the pointer array to the value list of information blocks according to said 2nd conversion array.

[Claim 27] [ the value list included in the information block about two or more specific items by the joint method based on the program indicated to Claim 16 ] Based on two or more tabular format data which became respectively equivalent, are the storage which memorized the program which can be executed in a computer system, and the method of showing the item value about a specific item is related with said two or more tabular format data. Tabular format data including the item in which a default sort order is reflected among the information blocks about said specific item in the case of presentation is determined as main table formal data. Determine the other tabular format data as \*\*\*\*\* data, and it is related with said main table formal data. Generate the pointer array to the value list of imagination which is the set intersections of two or more value lists which became equivalent, and it is related with said \*\*\*\*\* data. Generate the 2nd pointer array to the value list of said imagination, and in order of the value list item value of said imagination The 3rd pointer array which specifies the record number of said \*\*\*\*\* data is created. Specify the information block about the item which should be shown among the information blocks contained in said two or more tabular format data, and it is related with the information block which constitutes tabular format data among the information blocks about said item which should be shown. The pointer value under pointer array corresponding to a predetermined record number is referred to. Acquire a predetermined item value and it is related with the information block which constitutes said sub tabular format among the information blocks about said item which should be shown. With reference to the record number corresponding to said predetermined record number, it is based on the pointer value under pointer array to the corresponding value list of said imagination. In the information block which specifies the record number of said \*\*\*\*\* data under said 3rd pointer array, and constitutes said \*\*\*\*\* data The storage which memorized the program characterized by showing the item value which acquired and acquired the predetermined item value with reference to the pointer value under pointer array corresponding to the record number about the \*\*\*\*\* data concerned.

[Claim 28] [ the value list included in the information block about two or more specific items by the joint method based on the program indicated to Claim 16 ] Based on two or more tabular format data which became respectively equivalent, are the storage which memorized the program which can be executed in a computer system, and the method of showing the item value about a specific item is related with said two or more tabular format data. Tabular format data including the item in which a default sort order is reflected among the information blocks

about said specific item in the case of presentation is determined as main table formal data. Determine the other tabular format data as \*\*\*\*\* data, and it is related with each of said main table formal data and main table format record. By sorting said record number in items other than the item in which a default sort order is reflected, and sorting said record number in the item in which the above-mentioned sort order is finally reflected. Generate the 1st sorting array and the record number under said 1st sorting array is referred to. Take out the item value to which two or more value lists about said two or more items correspond, respectively, and the multidimensional array of the taken-out item value is stored in the corresponding position under multi-dimension value list equipped with the item value which consists of a multidimensional array of two or more item values. Store said record number in the position corresponding to said record number of the pointer array for specifying the multidimensional array of said multi-dimension value list, and it sets to which information block. In order of a value list item value, generate the 2nd pointer array which specifies the record number of said \*\*\*\*\* data, and it is related with the information block which constitutes said main table formal data among the information blocks about said item which should be shown. The pointer value of the pointer array for specifying the multi-dimension value list corresponding to a predetermined record number, and/ Or with reference to the pointer value of other pointer arrays, acquire a predetermined item value and it is related with the information block which constitutes said \*\*\*\*\* among the information blocks about said item which should be shown. In the information block which specifies the record number about \*\*\*\*\* under 2nd [ said ] corresponding pointer array with reference to the record number corresponding to said predetermined record number, and constitutes said sub tabular format data A predetermined item value is acquired with reference to the pointer value of the pointer array for specifying the multi-dimension value list corresponding to the record number about the \*\*\*\*\* data concerned, and/or the pointer value under pointer array. The storage which memorized the program characterized by showing the acquired item value.

[Claim 29] It is tabular format data coupling equipment which combines two or more tabular format data expressed as an array of the record with which each includes an item and the item value included in this. The value list with which the item value concerned is stored in each tabular format data in order of the item value number corresponding to the item value to which each belongs to a specific item, Between a data division means to divide into one or more information blocks which consist of pointer arrays in which the pointer value for directing the item value number concerned was stored in order of the unique record number, and two or more tabular format data In a sharing item specification means to find out an equivalent item and to specify the information block about said equivalent item, and each of two or more of said tabular format data In the value list sharing means which compares the value list included in said specified information block, and makes the value list of both equivalent, and the

information block to which the item value was added when making said value list equivalent Tabular format data coupling equipment characterized by combining tabular format data in said two or more tabular format data when [ the value list included in the information block about a specific item ] it has a renewal means of pointer value to add the pointer value of a related pointer array and is equivalent.

[Claim 30] It is based on two or more tabular format data it became equivalent value listing [ which is included in the information block about a specific item by tabular format data coupling equipment according to claim 29 ]. Are data presentation equipment which presents the item value about a predetermined item, and it is related with said two or more tabular format data. A key item determination means to determine the tabular format data which specified the information block about the key item which the pointer value of a pointer array does not overlap among the information blocks about said specific item, and was equipped with the information block concerned as sub tabular format data, The 2nd pointer generation means which generates the 2nd pointer array which specifies the record number of said sub tabular format data in order of a value list item value in which information block, A presentation item specification means to specify the information block about the item which should be shown among the information blocks contained in said two or more tabular format data, It is related with the information block which constitutes the main tabular format data which is tabular format data other than said sub tabular format data among the information blocks about said item which should be shown. The inside of the 1st item value acquisition means which acquires a predetermined item value with reference to the pointer value under pointer array corresponding to a predetermined record number, and the information block about said item which should be shown, The record number corresponding to said predetermined record number is referred to about the information block which constitutes said sub tabular format. In a sub tabular format record specification means to specify the record number about the sub tabular format under 2nd [ said ] corresponding pointer array, and the information block which constitutes said sub tabular format data Data presentation equipment characterized by having the 2nd item value acquisition means which acquires a predetermined item value, and showing the acquired item value with reference to the pointer value under pointer array corresponding to the record number about the sub tabular format data concerned.

[Claim 31] It is based on two or more tabular format data it became equivalent value listing [ which is included in the information block about a specific item by tabular format data coupling equipment according to claim 29 ]. Are data presentation equipment which presents the item value about a predetermined item, and it is related with said two or more tabular format data. The Lord / a \*\*\*\*\* means to determine the tabular format data with which a default sort order is reflected among the information blocks about said specific item in the case of presentation as main table formal data, and to determine the other tabular format data as

\*\*\*\*\* data, [ the information block which became are the information block which constitutes said \*\*\*\*\* data, and equivalent / the item value ] The 1st presence number array generation means which generates the 1st presence number array which stores the presence number which shows the number of the record about \*\*\*\*\* data corresponding to an item value, The 1st position directions array generation means which generates the 1st position directions array which determines the initial position arranged according to said 1st presence number array where the record number of said \*\*\*\*\* data is sorted, By incrementing the value to which the position directions array concerned corresponds, while arranging the record number of said \*\*\*\*\* data according to the 1st position directions array of the position shown with corresponding pointer value The 1st sorting array generation means which generates the 1st sorting array which the record number of \*\*\*\*\* data was sorted and was stored, The initial value of said position directions array and a final value, and the pointer array in the information block it became equivalent about said main table formal data the value listing are referred to. The 1st pointer array extension means which computes the multiplicity of the pointer array of other information blocks about said main table formal data, and extends a pointer array according to the multiplicity concerned, The initial value of said position directions array and a final value, and said sorting array are referred to. The multiplicity of the pointer array of the information block about said \*\*\*\*\* data is referred to. Data presentation equipment characterized by having the 2nd pointer array extension means which extends a pointer array according to the multiplicity concerned, and acquiring and showing a required item value based on the extended pointer array concerned.

[Claim 32] It is based on two or more tabular format data it became equivalent [ the value list included in the information block about two or more specific items by tabular format data coupling equipment according to claim 29 ], respectively [ data ]. Are data presentation equipment which presents the item value about a predetermined item, and it is related with said two or more tabular format data. The Lord / a \*\*\*\*\* means to determine tabular format data including the item by which a default sort order is reflected among the information blocks about said specific item in the case of presentation as main table formal data, and to determine the other tabular format data as \*\*\*\*\* data, A virtual array generation means to generate the pointer array to the value list of imagination which is the set intersections of two or more value lists which became equivalent about said main table formal data, The 2nd pointer array generation means which generates the 2nd pointer array to the value list of said imagination about said \*\*\*\*\* data, The 3rd pointer array generation means which creates the 3rd pointer array which specifies the record number of said \*\*\*\*\* data in order of the value list item value of said imagination, The inside of the information block specify the information block about the item which should be shown among the information blocks contained in said two or more tabular format data, and concerning a presentation block specification means and said

item which should be shown, The pointer value under pointer array corresponding to a predetermined record number is referred to about the information block which constitutes tabular format data. It is related with the information block which constitutes said sub tabular format among the 1st item value acquisition means which acquires a predetermined item value, and the information block about said item which should be shown. With reference to the record number corresponding to said predetermined record number, it is based on the pointer value under pointer array to the corresponding value list of said imagination. In a \*\* table format record number specification means to specify the record number of said \*\*\*\*\* data under said 3rd pointer array, and the information block which constitutes said \*\*\*\*\* data Data presentation equipment characterized by having the 2nd item value value acquisition means which acquires a predetermined item value, and showing the acquired item value with reference to the pointer value under pointer array corresponding to the record number about the \*\*\*\*\* data concerned.

[Claim 33] It is based on two or more tabular format data it became equivalent [ the value list included in the information block about two or more specific items by tabular format data coupling equipment according to claim 29 ], respectively [ data ]. Are data presentation equipment which presents the item value about a predetermined item, and it is related with said two or more tabular format data. The Lord / a \*\*\*\*\* means to determine tabular format data including the item by which a default sort order is reflected among the information blocks about said specific item in the case of presentation as main table formal data, and to determine the other tabular format data as \*\*\*\*\* data, [ items other than the item in which a default sort order is reflected ] about each of said main table formal data and main table format record By sorting said record number and sorting said record number in the item in which the above-mentioned sort order is finally reflected The record number under the 1st sorting array generation means which generates the 1st sorting array, and said 1st sorting array is referred to. A multidimensional-array generation means to store the multidimensional array of the taken-out item value in the corresponding position under multi-dimension value list equipped with the item value which serves as an item value specification means which takes out the item value to which two or more value lists about said two or more items correspond, respectively from the multidimensional array of two or more item values, In a record array generation means to store said record number in the position corresponding to said record number of the pointer array for specifying the multidimensional array of said multi-dimension value list, and which information block The 2nd pointer array generation means which generates the 2nd pointer array which specifies the record number of said \*\*\*\*\* data in order of a value list item value, It is related with the information block which constitutes said main table formal data among the information blocks about said item which should be shown. The pointer value of the pointer array for specifying the multi-dimension value list corresponding to a predetermined

record number, and/ Or the 1st item value acquisition means which acquires a predetermined item value with reference to the pointer value of other pointer arrays, It is related with the information block which constitutes said \*\*\*\*\* among the information blocks about said item which should be shown. A \*\* table format record specification means to specify the record number about \*\*\*\*\* under 2nd [ said ] corresponding pointer array with reference to the record number corresponding to said predetermined record number, The pointer value of the pointer array for specifying the multi-dimension value list corresponding to the record number about the \*\*\*\*\* data concerned in the information block which constitutes said sub tabular format data, And/or, data presentation equipment characterized by having the 2nd item value acquisition means which acquires a predetermined item value, and showing the acquired item value with reference to the pointer value under pointer array.

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#### [Detailed Description of the Invention]

##### [0001]

[Industrial Application] More this invention about the data-processing method and data processor which process a lot of data using an information processor like a computer [ details ] In the relational database, it is related with the method and equipment which combine two or more tabular format data, search the item value of a desired record etc., and total, and are sorted.

##### [0002]

[Description of the Prior Art] Although the database is used for various uses, use of the middle-scale relational database (RDB) which is, carries out and can eliminate logical conflict in a large system is in use. For example, RDB is used for systems, such as seat reservation of an airplane. In this case, by specifying a key item, a target (in the cases of many one affair) can also be searched quickly, or decision of reservation and cancellation are performed and a change etc. can be made. Moreover, since the number of seats of each facilities is hundreds at most, it can also be asked for the number of vacant seats of specific airmail. However, if it tries to calculate specification using this RDB every fiscal year, every day of the week, every month, every route, every time zone, and the whole model (for example, calculation of a seat-occupancy rate), it is known that it will take time very much. That is, while RDB is excellent in realizing processing without conflict, its performance which searches, totals or sorts the record of a considerable number is low.

[0003] Then, it has become common to build the database called a data warehouse (DWH) to a system apart from RDB in recent years for search or a total. Namely, according to the specific purpose of an end user, the very large-scale database equipped with a specific data

format and a specific data item name can be built, and the end user can make specific search and a specific total now using this.

[0004]

[Problem to be solved by the invention] [ however, preparing other DWH(s) other than RDB, i.e., forming two or more databases, ] Originally, since the central control of the data can be carried out, various problems which have deviated, and originate in this, for example, are described as a database and the figure which should exist essentially in which RDB was devised especially, below have arisen.

(1) Since DWH is fixed, it is difficult to carry out the search and the total of those other than the item beforehand prepared in DWH.

(2) It cannot respond to renewal of RDB etc. except that data volume becomes very large, in order to prepare DWH fixed besides RDB. This invention aims at being able to join two or more tabular format data at high speed like a request, and offering the presentation method for the structure of tabular format data also with the small data volume, its joint method, and united tabular format data at very high speed.

[0005]

[Means for solving problem] The purpose of this invention is the method of combining two or more tabular format data expressed as an array of the record with which each includes an item and the item value included in this. The value list with which the item value concerned is stored in each tabular format data in order of the item value number corresponding to the item value to which each belongs to a specific item, Constitute so that it may divide into one or more information blocks which consist of pointer arrays in which the pointer value for directing the item value number concerned was stored in order of the unique record number, and among two or more tabular format data Find out an equivalent item, specify the information block about said equivalent item, and it sets to each of two or more of said tabular format data. In the information block to which the item value was added when comparing the value list included in said specified information block, making the value list of both equivalent and making said value list equivalent In said two or more tabular format data when [ the value list included in the information block about a specific item ] adding the pointer value of a related pointer array and it is equivalent, it is attained by the joint method characterized by combining tabular format data.

[0006] According to this invention, by the value list with which the actual item value was stored, and the pointer array which stored the pointer value for specifying the value list item value concerned, the information block about a certain item is constituted, and tabular format data is expressed as the aggregate of the information block concerning various items. Therefore, when combining two or more tabular format data (namely, join), paying attention to the value list of [ in the information block between tabular format data ], the value list item value was

made equivalent and the pointer array which answers and relates to this is changed. Therefore, it becomes possible by adding the pointer value accompanying an addition and this of a value list item value (that is, sharing a value list) to combine two tabular format data, without requiring complicated processing.

[0007] In the desirable embodiment of this invention, only a single value list is actually held about the information block equipped with the value list which became equivalent. That is, about the shared value list, if either is held, it is sufficient. It enables this to reduce required memory space. Moreover, since processing great for a join is not needed, it becomes possible to realize combination (join) of tabular format data at very high speed.

[0008] By the above-mentioned joint method, the purpose of this invention prepares two or more tabular format data with which the value list included in the information block about a specific item became equivalent, and is related with said two or more tabular format data. The information block about the key item which the pointer value of a pointer array does not overlap among the information blocks about said specific item is specified. Determine tabular format data equipped with the information block concerned as sub tabular format data, and it is set to which information block. In order of a value list item value, the 2nd pointer array which specifies the record number of said sub tabular format data is generated. The information block about the item which should be shown among the information blocks contained in said two or more tabular format data is specified. It is related with the information block which constitutes the main tabular format data which is tabular format data other than said sub tabular format data among the information blocks about said item which should be shown. With reference to the pointer value under pointer array corresponding to a predetermined record number, acquire a predetermined item value and the record number corresponding to said predetermined record number is referred to about the information block which constitutes said sub tabular format among the information blocks about said item which should be shown. In the information block which specifies the record number about the sub tabular format under 2nd [ said ] corresponding pointer array, and constitutes said sub tabular format data It is attained also by the presentation method of the combined tabular format data which is characterized by showing the item value which acquired and acquired the predetermined item value with reference to the pointer value under pointer array corresponding to the record number about the sub tabular format data concerned.

[0009] According to this invention, a specific item is chosen by the user, for example about two or more tabular format data. When the presentation is called for, two or more tabular format data is combined, and the 2nd pointer array (as [ perform / namely, / reverse influence ]) which can specify the record number of sub tabular format data is generated from the record number of main tabular format data in sub tabular format data. A desired item value can be calculated by specifying the pointer value under pointer array and specifying further the item value

directed with the pointer value concerned from the record number of main tabular format data, about main tabular format data. About one of these, and sub tabular format data, from the record number of main tabular format data, specify the record number of sub tabular format data, and subsequently A desired item value can be calculated by specifying the item value directed with the pointer value and the pointer value concerned under pointer array one by one. Therefore, it becomes possible from two or more tabular format data to choose a desired item and to realize the joined table (view) at high speed.

[0010] Since the record number of the above-mentioned sub tabular format data is specified, the 2nd pointer array in which the pointer value for directing a record number was stored in order of the value list item value included in the information block concerned is generated to the information block about said key item, and a hand is also good for it. In this case, it sets to the information block which constitutes sub tabular format data among the information blocks about the item which should be shown. In the information block which specifies the record number about the sub tabular format data under 2nd corresponding pointer array with reference to the pointer value under pointer array corresponding to said predetermined record number, and constitutes the sub tabular format data concerned A predetermined item value is acquired by referring to the pointer value under pointer array corresponding to the record number under 2nd pointer array concerned. Explanation is more specifically [ this technique ] made with the form of the 1st operation.

[0011] Or it is the information block which constitutes said main tabular format data. The value list in the information block which became equivalent in order of a value list item value The 2nd pointer array in which the pointer value for directing the record number of said sub tabular format data was stored is generated. The record number about the sub tabular format data under said 2nd pointer array corresponding to said predetermined record number is specified. In the information block which constitutes said sub tabular format data among the information blocks about said item which should be shown The pointer value under pointer array corresponding to the record number about said sub tabular format data is referred to. [ may constitute so that a predetermined item value may be acquired, and ] (refer to the form of the 2nd operation) [ the information block about the item which should be shown at least among the information blocks which constitute said sub tabular format data ] The 2nd pointer array in which the pointer value for directing the record number of the sub tabular format data concerned was stored in order of the value list item value is generated. In the information block which constitutes sub tabular format data among the information blocks about said item which should be shown, the pointer value under pointer array corresponding to said predetermined record number is referred to. In the information block which specifies the record number about the sub tabular format data under 2nd corresponding pointer array, and constitutes the sub tabular format data concerned By referring to the pointer value under pointer array

corresponding to the record number under 2nd pointer array concerned, you may constitute so that a predetermined item value may be acquired (refer to the form of the 3rd operation).

[0012] In another embodiment of this invention, it follows in further predetermined sequence. [ the presence number which shows the number of the record about main tabular format data to the information block which should sort the item value ] Generate the presence number array stored corresponding to an item value, and said presence number array is followed. The position directions array which shows the initial value of a position which stores the record number about said main tabular format data is generated. While arranging the record number of said main tabular format data according to the position directions array of the position shown with corresponding pointer value The sorting array which the record number of main tabular format data was sorted, and was stored by incrementing the value to which the position directions array concerned corresponds is generated. A required item value is acquired in order of the record number stored in said sorting array, and it is constituted so that the item value sorted based on the key item concerned may be shown. Since the record number of main tabular format data specifies pointer value and an item value based on the record number which generated a sorting array which was stored with the sorted form, and was stored in the sorting array concerned according to the form of this operation, It can ask for a table (view) which was sorted about the desired item, without making complicated processing.

[0013] for example, when the item which should be sorted is a key item [ the presence number which shows the number of the pointer value under pointer array of the information block which is an information block which constitutes main tabular format data, and has a value list equivalent to the information block concerned in the information block about a key item ] The presence number array stored according to the order of the value list of [ in the information block of the key item concerned ] is generated. The pointer array in the information block which constitutes main tabular format data equivalent to the information block about a key item in being other, What is necessary is just to generate the presence number array which stores the presence number which shows the number of the records about main tabular format data in the information block which should sort said item value using said 2nd pointer array.

[0014] [ the method of showing the combined tabular format data in still more nearly another embodiment of this invention ] The value list included in the information block about a specific item prepares two or more tabular format data which became equivalent, and is related with said two or more tabular format data. The tabular format data with which a default sort order is reflected among the information blocks about said specific item in the case of presentation is determined as main table formal data. It is the information block which determines the other tabular format data as \*\*\*\*\* data, and constitutes said \*\*\*\*\* data. [ the presence number which shows the number of the record about \*\*\*\*\* data to the information block from which the item value became equivalent ] Generate the 1st presence number array stored

corresponding to an item value, and said 1st presence number array is followed. The 1st position directions array which determines the initial position arranged where the record number of said \*\*\*\*\* data is sorted is generated. While arranging the record number of said \*\*\*\*\* data according to the 1st position directions array of the position shown with corresponding pointer value By incrementing the value to which the position directions array concerned corresponds, the record number of \*\*\*\*\* data generates the 1st sorting array sorted and stored, and it The initial value and the final value of said position directions array The pointer array in the information block it became equivalent about said main table formal data the value listing is referred to. Compute the multiplicity of the pointer array of other information blocks about said main table formal data, extend a pointer array according to the multiplicity concerned, and The initial value and the final value of said position directions array, With reference to said sorting array, a pointer array is extended according to the multiplicity concerned with reference to the multiplicity of the pointer array of the information block about said \*\*\*\*\* data, and it is constituted so that a required item value may be acquired and shown based on the extended pointer array concerned. About this, more concrete explanation is added in the form of the 4th operation.

[0015] This embodiment may be applied when a key item cannot be found out about tabular format data. In this case, the item in which the default order of Sord is reflected is specified, and use as main table formal data tabular format data including this item, and let the other tabular format data be \*\*\*\*\* data. According to this embodiment, according to the multiplicity of a pointer array, this is extended and the item value is specified according to the extended pointer array. Therefore, even if it is the case where the tabular format data used by a certain item value overlapping is joined, it becomes complicated processing is unnecessary and possible to create a table (view) appropriately only by operation of a sorting array or a pointer array. In order to reduce the memory space of main table formal data It is desirable that the record number of main table formal data generates the 1st conversion array arranged by overlapping, and takes out a value list item value about said main table formal data with reference to the pointer array to the value list of information blocks according to said 1st conversion array based on said multiplicity. moreover, in order to reduce the memory space of \*\*\*\*\* data Based on said multiplicity relevant to the record number of said main table formal data, the record number of \*\*\*\*\* data generates the 2nd conversion array arranged by overlapping, and is related with said \*\*\*\*\* data. It is desirable to take out a value list item value with reference to the pointer array to the value list of information blocks according to said 2nd conversion array (refer to the form of the 5th operation).

[0016] [ the method of showing the combined tabular format data in still more nearly another embodiment of this invention ] The value list included in the information block about two or more specific items prepares two or more tabular format data which became respectively

equivalent, and is related with said two or more tabular format data. Tabular format data including the item in which a default sort order is reflected among the information blocks about said specific item in the case of presentation is determined as main table formal data.

Determine the other tabular format data as \*\*\*\*\* data, and it is related with said main table formal data. Generate the pointer array to the value list of imagination which is the set intersections of two or more value lists which became equivalent, and it is related with said \*\*\*\*\* data. Generate the 2nd pointer array to the value list of said imagination, and in order of the value list item value of said imagination The 3rd pointer array which specifies the record number of said \*\*\*\*\* data is created. Specify the information block about the item which should be shown among the information blocks contained in said two or more tabular format data, and it is related with the information block which constitutes tabular format data among the information blocks about said item which should be shown. A predetermined item value is acquired with reference to the pointer value under pointer array corresponding to a predetermined record number. It is related with the information block which constitutes said sub tabular format among the information blocks about said item which should be shown. With reference to the record number corresponding to said predetermined record number, it is based on the pointer value under pointer array to the corresponding value list of said imagination. In the information block which specifies the record number of said \*\*\*\*\* data under said 3rd pointer array, and constitutes said \*\*\*\*\* data It is constituted so that the item value which acquired and acquired the predetermined item value may be shown with reference to the pointer value under pointer array corresponding to the record number about the \*\*\*\*\* data concerned.

[0017] In two or more tabular format data, this embodiment can be applied, when two or more items are joined and presentation of a predetermined table (view) is called for. According to this embodiment, the pointer array to the value list which is not created actually and which is a with an item value [ two or more items of ] set intersection is created. Therefore, the table in the state where two or more items were joined (view) can be obtained at [ only generating a pointer array ] very high speed, without becoming an immense capacity actually creating the value list which is the set intersection expected. for example, when the number of the items which should be joined is two If the number of the value list item values which became equivalent concerning [ the number of the value list item values which became equivalent ] p and the information block of another side about one information block sets to q The pointer value Pmi (0 <=j<=p-1) to the value list of said imagination about said main table formal data is Pmi=Pm1 i\*q+Pm2 i (however, [ Pm1i ]). [ the value list item value about one information block, and Pm2i ] [ it is expressed the value list item value about the information block of another side, and ] The pointer value Psj (0 <=j<=p-1) to the value list of said imagination about said \*\*\*\*\* data is Psj=Ps1 j\*q+Ps2 j (however, [ Ps1i ]). The value list item value about one

information block and Ps2i are expressed as the value list item value about the information block of another side.

[0018] [ the method of further others for combining two or more items which can be set to two or more tabular format data (join), and showing the item value of a desired item ] The value list included in the information block about two or more specific items prepares two or more tabular format data which became respectively equivalent, and is related with said two or more tabular format data. Tabular format data including the item in which a default sort order is reflected among the information blocks about said specific item in the case of presentation is determined as main table formal data. Determine the other tabular format data as \*\*\*\*\* data, and it is related with each of said main table formal data and main table format record. By sorting said record number in items other than the item in which a default sort order is reflected, and sorting said record number in the item in which the above-mentioned sort order is finally reflected Generate the 1st sorting array and the record number under said 1st sorting array is referred to. The item value to which two or more value lists about said two or more items correspond is taken out, respectively. The pointer array for storing the multidimensional array of the taken-out item value in the corresponding position under multi-dimension value list equipped with the item value which consists of a multidimensional array of two or more item values, and specifying the multidimensional array of said multi-dimension value list as it, Store said record number in the position corresponding to said record number, and it sets to which information block. In order of a value list item value, generate the 2nd pointer array which specifies the record number of said \*\*\*\*\* data, and it is related with the information block which constitutes said main table formal data among the information blocks about said item which should be shown. The pointer value of the pointer array for specifying the multi-dimension value list corresponding to a predetermined record number, and/ Or with reference to the pointer value of other pointer arrays, acquire a predetermined item value and it is related with the information block which constitutes said \*\*\*\*\* among the information blocks about said item which should be shown. In the information block which specifies the record number about \*\*\*\*\* under 2nd [ said ] corresponding pointer array with reference to the record number corresponding to said predetermined record number, and constitutes said sub tabular format data It is constituted so that the item value which acquired and acquired the predetermined item value may be shown with reference to the pointer value of the pointer array for specifying the multi-dimension value list corresponding to the record number about the \*\*\*\*\* data concerned, and/or the pointer value under pointer array. About this, concrete explanation is made by the form of the 7th operation. According to this embodiment, since it is not necessary to prepare the pointer array to the value list of imagination, it becomes possible to reduce required memory space further. Moreover, the purpose of this invention is realized by the coupler of the storage which memorized the program which realizes the above-

mentioned method, and the tabular format data which consists of a means to realize the step of the above-mentioned method, and the presentation equipment of tabular format data.

[0019]

[Mode for carrying out the invention] With reference to an accompanying drawing, explanation is hereafter added per form of operation of this invention. Drawing 1 is a block diagram which shows the hardware configuration of the computer system which can realize the search, total, and the search method concerning the form of operation of this invention. As shown in drawing 1 , [ this computer system 10 ] By being the same composition as the usual thing, and executing a program [ the whole system and each component ] [ CPU12, work data, etc. to control ] RAM to memorize (Random Access) [ Memory14, a program, etc. ] Between the external terminals connected with the CD-ROM driver 20 for accessing fixed-storage media [, such as ROM(Read Only Memory) 16 to memorize and a hard disk, ] 18 and CD-ROM19, the CD-ROM driver 20, or the external network (not shown) It has the established interface (I/F) 22, the input unit 24 which consists of a keyboard or a mouse, and CRT display 26. CPU12, RAM14, ROM16, the external storage 18, I/F22, the input unit 24, and the display device 26 are mutually connected through Bath 28. The program which combines the tabular format data concerning the form of this operation (join), The program, the retrieval program, tabulation program, and sort program which create the table (view) of a predetermined item from united tabular format data may be accommodated in CD-ROM19, may be read by the CD-ROM driver 20, and may be beforehand memorized by ROM16. Moreover, you may memorize what was once read from CD-ROM19 to the predetermined field of the external storage 18. Or the above-mentioned program may be supplied from the outside through a network (not shown), an external terminal, and I/F22.

[0020] Moreover, in the form of this operation, in order to realize search, total, and sorting at high speed, it is necessary to generate the information block of a predetermined data format so that it may mention later. Similarly, this information block generator may also be accommodated in CD-ROM19, and may be memorized by ROM16, or may be memorized by the external storage 18. Or it cannot be overemphasized that these programs may be supplied from the outside through a network (not shown). Moreover, in the form of this operation, the data (information block) generated in the information block generator is memorized by RAM14, or is memorized to the predetermined field of the external storage 18.

[0021] Next, explanation is added per principle of the data format which will be the requisite for this invention, search and a total, and sorting. this invention person devised the construction of tabular format data which has a specific data format, and search, a total and the sorting method in order to attain ultra high-speed-ization of processing last year (Tokuganhei10-227278). Also in this invention, fundamentally, based on this application, tabular format data was built as the aggregate of a predetermined information block, and \*\*\*\*\* search,

total, and sorting are realized. Drawing 2 is the figure showing the information block used with the form of this operation. As shown in drawing 2, the information block 100 includes the pointer array 120 to the value list 110 and a value list. The value list 110 is the table on which the item value 111 corresponding to the above-mentioned item value number was stored in item value numerical order that the item value belonging to the item set in order (integer-izing), and was carried out to each item of tabular format data. The pointer array 120 to a value list is an array in which the item value number of the sequence (namely, item) with tabular format data, i.e., the pointer to the value list 110, was stored in order of the record number of tabular format data.

[0022] By combining the pointer array 120 to the above-mentioned value list, and the value list 110 When a certain record number is given, take out the item value number stored corresponding to the record number from the pointer array 120 to the value list about a predetermined item, and subsequently By taking out the item value stored within the value list 110 corresponding to the item value number, an item value can be acquired from a record number. Therefore, all the data (item value) can be referred to like the conventional data table using the coordinate of a record number (line) and an item (sequence). For example, the tabular format data shown in drawing 3 (a) is considered. Various item values are given to the item of Customer ID, a customer name, and the telephone number in this example. In the form of this operation, such tabular format data is held as an information block of the form shown in drawing 3 (b) or (d). For example, the pointer array 120-1 is related with the value list 110-1 which stored the item value which shows Customer ID in drawing 3 (b). That is, the pointer value of the pointer array of a head record (record number "0") is 0, and the item value "1" which shows Customer ID is acquired corresponding to this. The pointer array 120-2 is related with the value list 110-2 which stored the item value which shows a customer name in drawing 3 (b). For example, the pointer value in the pointer array of a head record (record number "0") is "5", and the item value "Yamada O man" which shows a customer name is acquired corresponding to this. Also in drawing 3 (c), he can understand that the pointer array 120-3 is similarly related with the value list 110-3 which stored the item value which shows the telephone number. Moreover, in each value list, he can understand that an item value can set in order and is (this example ascending order).

[0023] Furthermore, in the form of this operation [ the value managed table of the information block 100 ] The class number flag array used for search besides the value list 110 or a total, the starting position array which shows the start address of room which should store the pointer corresponding to an item value, and the presence number array are included. Each flag of a class number flag array and each presence number of the presence number array are matched with each of the item value. The flag value of a class number flag is usual. It is "0" and is set to "1" corresponding to the item value which should be found out in the case of

search or a total. Moreover, a presence number corresponds to the number of a record which has the item value. In addition, in order to correspond to the thing adding the presence number corresponding to pointer value smaller than corresponding pointer value, it is not necessary to necessarily prepare a starting position. The figure in which drawing 4 (a) shows other examples of tabular format data, drawing 4 (b), and (c) are the figures showing the information block about "sex" and "age", respectively. As shown in drawing 4 (b), the class number corresponding to the item value (a "male" and "woman") corresponding to each pointer value and each item value of the pointer array 220, the starting position, and the presence number are shown in the value managed table 210-1 of the information block 200-1 about sex. For example, the number of the records of as [ whose pointer value is "0" ("that is, a value list item value male") ] is 632564, and the number of the records of as [ whose pointer value is "1" ("that is, a value list item value woman") ] on the other hand ] has become 367426 pieces. Moreover, the starting position corresponding to each item value shows the start address of the pointer array 230-1 to the record mentioned later. Also in drawing 4 (c), he can understand the same thing.

[0024] It explains below about an example of search using the information block which has such a data structure, and the generation processing of an information block. Drawing 5 is a flow chart which shows the search technique about a single item. This processing is realized when CPU12 (refer to drawing 1) execute a predetermined retrieval program. The record whose item value of "age" is 16 years old or 19 years old is searched with this example. First, the information block 200-2 about the "age" shown in drawing 4 (c) among the information blocks about tabular format data is specified (Step 501).

[0025] Subsequently, in the value list 210-2 of specified information blocks ("a specific information block" is called hereafter.), the class number of the line corresponding to that (16 years old or 19 years old) with which an item value agrees in the above-mentioned search condition is set to "1" (Step 502). In this example, the class number of the line corresponding to an item value number "0" and an item value number "3" is set by 1. Subsequently, the starting position and presence number corresponding to the line by which the class number is set to "1" are acquired (Step 503). These information is called pointer extraction information. In the pointer array to a record, the record number which shows the pointer to the record corresponding to a search condition is taken out based on the pointer extraction information acquired at Step 503 (Step 504). [ the pointer of the record corresponding to an item value number "0" ] in this example It is stored in the field from the starting position "0", i.e., the head, of a pointer array to a record to the 45898th piece, and [ the pointer of the record corresponding to an item value number "3" on the other hand ] It turns out from the 2383137th of the pointer array to a record that it is stored in the field for 189653 pieces. Finally, in order to enable it to use by next processing, the array of the taken-out record number is created as a

result set, and this is held (Step 505). Moreover, a total and sorting are also realizable by using a class number, a starting position, and a presence number.

[0026] Next, explanation is added per generation processing of the information block for using for retrieval processing which was mentioned above. Drawing 6 is a flow chart explaining the processing for creating an information block based on tabular format data. First, a system 10 acquires the original data of a tabular format, and decomposes this into the thing according to item (Step 601). This original data may be shown in drawing 7 (a), and may be shown in drawing 7 (b), for example. These Hara data may be supplied from the outside and may be memorized by the fixed-storage medium 18. The processing block 610 which consists of Step 602 or Step 604 described below shows generation of the information block about one certain item. Therefore, when generating the information block about two or more items, processing corresponding to the processing block 610 only in the number of items is performed. Taking the case of the information block of the item about "sex", explanation is added hereafter.

[0027] First, the field for the information blocks of the item about "sex" is secured into RAM14, for example (Step 602). Subsequently, a value managed table is generated all over this secured field. A value managed table is first initialized more by details. Subsequently, it is found out by operating the data about "sex" from a head to a tail among original data what kind of subject name exists how many, respectively. In this example, the subject name a "woman" and a "male" is found out only for 367436 pieces and 632564 of a certain thing, respectively. Thereby, the item value of a "woman" and a "male" is set to a value list, and a predetermined number is set to it by the presence number array. An item value is sorted in accordance with predetermined criteria after that. In the case of sorting, a presence number is also rearranged according to rearrangement of the number of items. Subsequently, the value of a starting position array is determined. This is called for by accumulating the presence number located in a high order from self by sorting. Moreover, the value of a starting position array is assigned to the value of a corresponding class number array. This value is used at the following step.

Thus, after a value managed table is generated, the pointer array to a record is generated. The area size of this pointer array corresponds to total of a presence number. Thus, it becomes possible to make the information block about a predetermined item. This information block is generated beforehand and processing of search, a total, and sorting is performed using the generated information block.

[0028] Now, it explains below combining two tabular format data (execution of JOIN (join) processing) per the processing which creates one table (view), and processing which searches, totals and sorts a desired item from what was created. For example, two tabular format data as shown in drawing 8 is considered. In drawing 8 (a), for every customer ID, a customer name, the telephone number, and SVC-ID (service ID) are matched, and the annual fee is matched for every service ID in one of these, and drawing 8 (b). If SVC-ID of the

"Yamada O man" who is "1" is "D" and Customer ID refers to the "D" clause of the service ID of a service table, he can understand that his annual fees are "12,000" circles. Similarly the annual fee can be known by referring to SVC-ID and Service ID about other customers. It is drawing 8 (c) which expressed Customer ID, the customer name, and the annual fee with the view of a tabular format. So that he can understand from drawing 8 (c) [ this view ] From "SVC-ID" (for example, in "SVC-ID", two or more item values "C" and "D" have appeared.) which is an item with a duplication value, the amount billed is displayed via the "service ID" which is what is called a key item without a duplication value. In consideration of being what goes via an item (= "1") without a duplication value, this is called the type of "":1" from an item (= "") with a duplication value. Moreover, in this Description, main tabular format data and the near tabular format data of "1" are also called sub tabular format data for the near tabular format data of the above "":."

[0029] "": Explain below per [ which joins two tabular format data which is the types of 1" ] technique. In the form of this operation, the information block as beforehand shown in drawing 9 from the data of two tabular formats shown in drawing 8 with the technique shown in drawing 6 is generated. In addition, drawing 9 (a) or (d) is an information block about the customer table shown in drawing 8 (a), and drawing 9 (e) and (f) are the information blocks about the service table shown in drawing 8 (b). Moreover, only the value list is illustrated in these figures.

[0030] In the customer table, the service ID of A, B, C, and D is used in the service table to "SVC-ID" of B, C, and D being used. Therefore, it is necessary to communalize the value list of [ in the information block of "SVC-ID" ], and the value list of [ in the information block of "Service ID" ]. The functional block diagram of CPU12 which require drawing 10 for the form of this operation, and drawing 11 are flow charts which show the processing for sharing of a value list. The table extraction section 32 which finds out the value list which should share CPU12 with reference to an information block as shown in drawing 10 , It has the value list conversion section 34 which shares a value list, the pointer processing section 36 which generates other required pointer arrays while changing each pointer value of the pointer array to a value list, and the information block Management Department 38 which deliver and receive data with RAM14 grade. As shown in drawing 11 , the information block Management Department 38 takes out the information block about both tabular format data from RAM14 first (Step 1101). Subsequently, the table extraction section 32 extracts the value list which should be shared with reference to the value list of information blocks (Step 1102). For example, in the example which shows drawing 8 and drawing 9 , the value list of information blocks of "SVC-ID" is extracted about a customer table, and the value block of the information list of "Service ID" is extracted about a service table.

[0031] After that, between two value lists which the value list conversion section 34 should

share, conversion of an item value etc. chooses a required thing (Step 1103), and inserts an item value with reference to the value list of another side. In the example shown in drawing 8 and drawing 9, conversion of the value list item value about "SVC-ID" which is an item with a duplication value is needed. The value list conversion section 34 finds out the item value which is not included in the value list of "SVC-ID" among the value list item values about the "service ID" which is a key item. Subsequently, the value list conversion section 34 inserts the found-out item value in the value list about "SVC-ID" according to predetermined sequence (Step 1104). It is necessary to change the pointer array which, on the other hand, includes the pointer value to a value list according to insertion of a value list item value. Therefore, the pointer processing section 36 generates the pointer value of the pointer array corresponding to the value list with which conversion of the item value was made according to conversion of a value list (Step 1105). Drawing 12 is a figure which illustrates the processing performed at Step 1104 and Step 1105 about the example shown in drawing 8 and drawing 9. A value list item value "A" is inserted in the information block of "SVC-ID" which should change insertion of a value list item value, and the pointer value under pointer array. With the form of this operation, since the item value is arranged in ascending order, an item value "A" is inserted in a top line. Since the item value was newly made by the top line, "1" is added to the pointer value under pointer array, respectively. Although one item value is inserted in the head in the above-mentioned example, it cannot be overemphasized that two or more item values may be inserted in arbitrary positions. In this case, as for pointer value, only the number of the item values inserted in from a head before a self position should increase that value.

[0032] Thus, after sharing of a value list is completed, in order to generate a view which two tabular format data joined, or in order to enable execution of search, a total, and sorting application at high speed, predetermined processing is performed to the information block about a service table. The pointer processing section 36 generates a pointer array (pointer array to a record number) which directs a record number from the value list of tables (namely, table which a value list is not performed and is not making the change of the pointer array) of another side (Step 1106). The pointer array to this record number is generated in the table of another side in the information block containing that by which sharing of the value list was not made among the items which should be displayed in the joined table (view).

[0033] In details, first more [ the pointer processing section 36 ] The pointer array to a value list and the array of the same size are prepared, pointer value is scanned from the head of the pointer array to a value list, and when the pointer value of eye "i" watch is "j", in the prepared array, processing which stores a value "i" in the element of eye "j" watch is performed. Thus, the pointer to a record number is generated. The information block Management Department 38 memorizes the information block by which the item value etc. was changed, and the information block to which a new pointer array was added to the predetermined field of RAM14

(Step 1107). In addition, since the value list of two tables has common implications in the processing of sharing mentioned above, it cannot be overemphasized that what is necessary is to hold only which value list. Thus, after making the same the implications in which a value list has a predetermined value list about the both sides of sharing, i.e., two tabular format data, "view creation processing", the retrieval processing, total processing, or sorting application which creates the view which took out the desired item is performed.

[0034] It explains below about view creation processing. The flow chart and drawing 14 drawing 13 indicates view creation processing to be are a figure for explaining concretely the processing as which the view about "Customer ID", a "customer name", and an "annual fee" is displayed. Here, drawing 13 (a) shows the processing in the case of displaying an item value [ be / it / under / value list / being related ] based on a pointer array, and drawing 13 (b) shows the processing in the case of displaying the item value about the value list of further others based on the shared value list. For example, if the processing about the display of "Customer ID" shown in drawing 14 is described, a record number will be initialized first (Step 1301). Subsequently, in the information block of "Customer ID", the pointer value "0" of the line corresponding to a record number "0" is referred to during the pointer array to a value list (Step 1302), and a corresponding item value "1" is read (Step 1303). Therefore, the item by the side of Customer's ID top is set to "1" (Step 1304). About all the record numbers, processing of the above-mentioned steps 1302-1304 is repeated (Step 1305, 1306 references). Processing with the same said of the display of a "customer name" is performed. More, the pointer value "5" located in the line corresponding to a record number "0" is referred to, and a corresponding item value "Yamada O man" is read to details. Thereby in a table (view), a top item serves as a "Yamada O man."

[0035] When related with the value list shared on the other hand (i.e., when using the pointer of "SVC-ID" and "Service ID" etc.) As shown in drawing 13 (b), a record number is initialized (Step 1311) and the pointer value "3" to the value list of lines corresponding to a record number "0" is referred to (Step 1312). Subsequently, the shared information block (in this case) In the pointer array (refer to Step 1106 of drawing 11 ) to the record number previously generated about the information block of "Service ID", the pointer value located in the line shown with pointer value "3" is referred to (Step 1314). The pointer value referred to at Step 1314 becomes possible [ acquiring a required item value ] by passing through the pointer to the value list of other information blocks from a value list which carries out "reverse influence" to a record number, and is located in the line corresponding to this pointer value. Based on the pointer value "3" to a record number, in the information block of an "annual fee", the pointer value "0" under pointer array to the value list of lines corresponding to a record number "3" is found out, and a corresponding item value "12,000" can be taken out in the above-mentioned example. Therefore, the item of most a top is set to "12,000" in a table. About all the record

numbers, all the items of the column of (Step 1316, 1317 references), and an annual fee can be acquired by repeating processing of the above-mentioned steps 1312-1315. Thus, it becomes possible to obtain a table (amount-billed view) as shown in drawing 8 (c).

[0036] Next, explanation is added per [ which obtains the table sorted about the required item ] processing. It is a figure for drawing 15 to explain the processing which the flow chart and drawing 16 which show the contents of this processing are a view about "Customer ID", a "customer name", and an "annual fee" concretely, and displays the view sorted based on "Service ID." This processing consists of generation (Step 1501 - Step 1507) of a presence number array etc., and generation (Step 1508 - Step 1513) of the sorting array. First, a record number is initialized (Step 1501) and the presence number array which has the same line count as the line count (item number) of a value list is secured (Step 1502). Subsequently, about a certain record number, the pointer array of a value list is referred to (Step 1503), and the value under presence number array of the line corresponding to pointer value (presence number) is incremented (Step 1504). For example, in drawing 16 (a), about the information block of "SVC-ID", the pointer value under pointer array to the value list corresponding to a record number "0" is "3", therefore the value (presence number) of the corresponding line under presence number array (the 4th line) is set to "0" to "1." Or the pointer value under pointer array to the value list corresponding to a record number "2" is "1", and, thereby, the value of the corresponding line under presence number array (the 2nd line) is set to "0" to "1." Thus, (Step 1505 and step 1506 reference) and a presence number array as shown in the sign 1601 of drawing 16 (a) are created by performing processing shown in Step 1503 and Step 1504 to all the record numbers.

[0037] Completion of a presence number array will generate the number array of accumulating totals, and the starting position array which shows the position in the room in which a record number should be located by sorting based on this (Step 1507). This number array of accumulating totals is a first stage starting position array and an equal, and is used by the various processings mentioned later. In addition, in this Description, the number array of accumulating totals or a first stage starting position array is also called the position directions array or the first stage position directions array which shows initial value. The number of accumulating totals and starting position in the position corresponding to the line in which a certain presence number under presence number array is located become details more with total of the presence number in the line ( drawing 16 upper line) whose number is smaller than the line in which the presence number concerned is located. For example, the number of accumulating totals and starting position of the 1st line are "0", and since the presence number of the 1st line is "0", the number of accumulating totals and starting position of the 2nd line are also set to "0." On the other hand, since [ the ] the presence number of the 1st line is [ "0" and the presence number of the 2nd line ] "2", the number of accumulating totals and starting

position of the 3rd line are set to "(0+2=) 2."

[0038] Thus, creation of a presence number array, the number array of accumulating totals, and a starting position array will perform processing arranged in the position which had each record number sorted using the made starting position array. first, a record number is initialized (Step 1508) and the array which should store a record number secures -- having (Step 1509) -- the pointer array of a value list is referred to about a certain record number (Step 1510).

Subsequently, in a starting position array, the starting position of a line which the pointer value acquired at Step 1510 shows is investigated, and the record number concerned is stored in the field corresponding to the obtained starting position in a record-number array (Step 1511). For example, in drawing 16 (b), in the information block of "SVC-ID", since the pointer value under pointer array to the value list corresponding to a record number "0" is "3", a corresponding starting position (starting position of the 4th line) is referred to. Since this value is "5", a record number "0" is stored in the position (namely, the 6th line) corresponding to "5" in a record-number array. An end of storing of a record number will increment the starting position referred to (Step 1512). This is because it is next necessary to increment the position which should store the record number in a record number when this starting position is referred to. It becomes possible to obtain the sorted record-number array by what (Step 1512, 1513 references) such processing is performed for about all the required record numbers (refer to drawing 17 ).

[0039] After sorting application is completed, based on display items, such as the customer ID corresponding to the record number obtained by the processing shown in drawing 12 , a customer name, and an annual fee, and the sorted record-number array which was obtained by drawing 15 , the table (view) sorted in the desired item can be obtained. Drawing 18 (a) is the figure showing the table (amount-billed view sorted with "Service ID") obtained by having done in this way. For example, also when sorting in other items (for example, "annual fee"), you can understand that a table (amount-billed view sorted by the "annual fee") as shown in drawing 18 (b) using the same technique can be obtained. Thus, according to the form of this operation, in two tabular format data, it becomes possible to realize the join of two tabular format data by finding out the value list which should be shared among the information block which constitutes each tabular format data, and carrying out the implications which the value list concerned has in common.

[0040] Next, explanation is added per form of operation of the 2nd of this invention. With the form of the 1st operation, in the shared information block, first with reference to the pointer value to the value list of one information blocks ("\*\*: near information block of "\*\*\* in 1") subsequently The pointer value to the value list corresponding to the record number which the pointer value to a record number shows further with reference to the pointer value to the information block ("\*\*: near information block of "1" in 1") record number of another side shown

with this pointer value is referred to. In the example shown in drawing 14 , for example, the pointer array to the value list of [ in the information block of \*\* "SVC-ID" ], \*\* The pointer array to the record number in the information block of "Service ID" and the pointer array to the value list of [ in the information block of \*\* "annual fee" ] are used, and each pointer value is referred to one by one. On the other hand, with the form of the 2nd operation, the pointer array to the record number of the information block of another side is prepared for one information block (\*\*: near information block of \*\*\* in 1"). That is, the pointer array which unified \*\* and \*\* among the above-mentioned \*\* - \*\* is built to concerned one information block. This becomes possible [ specifying the record number by the side of one ] from the near information block of \*\*\*." In addition, in the form of the 2nd operation, the composition of the information processor 10, the processing performed, etc. are the same as that of the thing of the form of the 1st operation except for the point described below.

[0041] Drawing 19 is a figure for explaining the processing for sharing of a value list. At drawing 19 (a), a part of information block about the customer table about a form and service table of the 1st operation is shown, and drawing 19 (b) shows a part of information block about the form of the 2nd operation. So that he can understand from drawing 19 [ the form of the 1st operation ] The pointer processing section 36 (refer to drawing 10 ) generated the pointer array (pointer array to a record number) for referring to the pointer array to the value list of [ in the information block of an "annual fee" ] to the information block side of "Service ID." On the other hand, in the form of the 2nd operation, the pointer processing section 36 generates the pointer array to the record number for referring to the pointer array to the value list of information blocks of the "annual fee" which is an information block to refer to finally to the information block side of "SVC-ID." The inside of the information block which more specifically includes the shared value list in the form of the 1st operation, A thing equivalent to the pointer array to the record number created about the near information block (it is [ in / for example, / drawing 19 (a) ] the information block of "Service ID" of "1" is created virtually. What is necessary is just to make the pointer array which can point to a direct "1" near record number from the near information block of \*\*."

[0042] In addition, since the pointer value under pointer array to a record number is located in a line in ascending order in the information block of "Service ID" in the example shown in drawing 19 (b), In the information block of "SVC-ID", although the pointer value under pointer array to a value list and the pointer value under pointer array to a record number are in agreement, it cannot be overemphasized that it is not necessarily in agreement.

[0043] According to the form of this operation, in order to create the pointer array to a record number to the near information block of \*\* in \*\*:1", as compared with the form of the 1st operation, the size of a pointer array becomes large at it. However, when creating a view or performing sorting, the number of the pointer arrays to refer to can be decreased, and this

becomes possible [ accelerating processing further ].

[0044] Next, explanation is added per form of operation of the 3rd of this invention. In the form of this operation, the pointer array is prepared by the "1" in "\*\*\*:1" side into the information block (at the example shown in drawing 9 , it is the information block of an "annual fee") which should finally display an item value (refer to drawing 20 ). That is, with the form of the 2nd operation, it is prepared in the near information block of "1" about the item which was prepared in the near information block of "\*\*\*" and which the pointer array (refer to drawing 19 (b)) to a record number should show in a table (view). According to the form of this operation, since the record number about the near table of "1" can be specified directly, it becomes possible from the record number about the near table of "\*\*\*" to accelerate processing further.

[0045] Next, explanation is added per form of operation of the 4th of this invention. Although related with a type ("\*\*: type of 1") which goes via the item (= "1") which does not have a duplication value from an item (= "\*\*\*") with a duplication value in the form of the 1st or the 3rd operation With the form of the 4th operation, processing which shares a value list is performed in the type of "\*\*\*:\*\*." For example, the data of two tabular formats as shown in drawing 21 is considered. In drawing 21 (a), the member name and the baseball team name which a member likes are matched, and the game day is matched with the professional baseball team name in drawing 21 (b). Here, when drawing 21 (a) is referred to, it is the fan of "Mr. Tanaka" is "A team", and by referring to drawing 20 (b) shows further that the games of "A team" are "5/10" and "5/11." Moreover, it is the fan of "Mr. Suzuki" is also "A team", and it turns out that the game is "5/10" and "5/11." It seems that therefore, the table (ticket check view) in which each member shows a desired ticket is shown in drawing 21 (c). Although the item of a "fan" or a "professional baseball team name" is joined in this view The item of a "fan" has a duplication value (the item value of that is, "A team" overlapping, and appearing), and the item of a "professional baseball team" on the other hand also has a duplication value (that is, the item value of "A team" overlapped and it has appeared). In consideration of being what goes via an item (= "\*\*\*") with a duplication value, such a thing is called the type of "\*\*\*:\*\*\*" from an item (= "\*\*\*") with a duplication value.

[0046] moreover, [ the type of "\*\*\*:\*\*\*" ] logically although two tables (in drawing 21 -- a "baseball lover meeting member table" and a "game schedule table") are equal Here, the "main table" and the table of another side are called a "\*\*\* table" for the table (in drawing 21 , it is a "baseball lover meeting member table") on which the default sort order of the table (view) outputted is reflected. Moreover, in this Description, the above-mentioned main table is called main table formal data, and a \*\* table may be called \*\*\*\*\* data depending on the case. Like the form of the 1st or the 3rd operation, also in the form of the 4th operation, CPU12 are equipped with composition as shown in drawing 10 , and processing as shown in drawing 22 is performed by CPU12.

[0047] In drawing 22, [ processing (Step 2201) of value list sharing ] [ the processing (Step 2202) which is equivalent to the processing shown in drawing 11, and generates the presence number array about a \*\* table etc. ] Abbreviation correspondence of the processing (Step 2203) which carries out abbreviation correspondence at the preceding paragraph (Step 1501 - Step 1507) of the processing shown in drawing 15, and generates the sorting array of a \*\* table is carried out in the latter part (Step 1508 - Step 1513) of the processing shown in drawing 15. The value list which should be shared is extracted in Step 2201 (Step 1102 of drawing 11). Selection of a thing to be changed [ of an item value ] will insert the required item value under value list (Step 1104 of drawing 11, the sign 2301 of drawing 23, and 2302 references). (Step 1103) Subsequently, the pointer value under pointer array to the value list in the information block including the changed value list is updated (Step 1105 of drawing 11, the sign 2303 of drawing 23, and 2304 references). In the example of drawing 23, although the conversion or updating of the pointer array to the value list and value list of the main table is performed, chisels, such as conversion about the main table, are not necessarily performed, and conversion about a \*\* table, etc. conversion about both tables, etc. may be performed.

[0048] Subsequently, in Step 2202, a presence number array (not shown), the number array of accumulating totals (not shown), and a starting position array (refer to the sign 2402 of drawing 24) are generated about a \*\* table. Where Step 2401 is completed, the value of a certain line under number array of accumulating totals and the value of the position where a starting position array corresponds are equal. In a \*\* table, after the shared value list, and a corresponding presence number array and a corresponding starting position array are made, the sorting array about a \*\* table is generated (Step 2203). Since the pointer value under pointer array to the value list corresponding to a record number "0" is "2" in the information block of a "professional baseball team" in drawing 24, A corresponding starting position (the 3rd line of a starting position array) is referred to (refer to Step 1510 of drawing 15), and a record number "0" is arranged in the position (namely, the 4th line) where a sorting array (record-number array) corresponds according to this value "3" (refer to Step 1511 of drawing 15). Moreover, the value in the starting position referred to is incremented, and it changes from "3" to "4."

[0049] After each record number about a \*\* table has been arranged in the predetermined position of a sorting array (record-number array) (refer to the sign 2401 of drawing 24), the pointer array to the value list of the main table is newly generated. By a type of "\*\*\*\*" like the form of this operation, this is because it enables it to correspond to this, in order that the item value in the information block by the side of the main table may carry out a multiple-times appearance. As shown more in details at drawing 25, it is related with a certain record number after initialization (Step 2501) of a record number. The pointer array to the value list of [ in the information block including the shared value list ] is found out, and the pointer value of the

position (line) corresponding to a record number is referred to (Step 2502). Subsequently, the number array of accumulating totals and starting position array which were created by sorting (refer to Step 2203) of the \*\* table are found out, and the difference of the starting position of a position and the number of accumulating totals which pointer value shows is computed (Step 2503).

[0050] This difference means whether about a record number with the main table, the item value under value list of information blocks including the shared value list overlaps how many times, and appears in the \*\* table. Therefore, in the joined table (view), the pointer array to the value list of [ in the information block about the item which originally suited the main table side ] is extended based on the difference which shows the above-mentioned multiplicity (Step 2504). That is, when the difference computed about a certain record number is "d", in the pointer array to the value list which should newly be generated, the pointer value corresponding to a record number increases to the "d" individual.

[0051] In drawing 26, the pointer array to the value list of [ in the information block of the "fan" including the shared value list ] is found out about a record number "0." Since the pointer value of the position (the 1st line) corresponding to a record number "0" is "0" in this pointer array, The number of accumulating totals and starting position of the 1st line are referred to among the number array of accumulating totals in the information block of the "professional baseball team" including the value list shared in the \*\* table side, and a starting position array, and the difference (2-0=2) of a starting position and the number of accumulating totals is computed. Subsequently, in order to create the joined table (view), the new pointer array which extended the pointer array to the value list of information blocks of the "member name" in the main table is created. In addition, the information block including a new pointer array (the value list of [ in the information block of "a ticket and a member name" ] is the same as that of what is contained in the information block of the "member name" of the main table.) This is because the item value of a "member name" itself is common in both. Thus, two pointers of as [ whose pointer value is "2" ] will be made. Since similarly the pointer value of the position (the 2nd line) corresponding to the record number "1" in the information block of a "fan" about a record number "1" is 2, In the information block of a "professional baseball team", the corresponding number of accumulating totals and corresponding starting position of a position (the 3rd line) are taken out, and the value (4-3=1) which pulled the former from the latter is computed. Therefore, in the information block of "a ticket and a member name", it continues at the pointer made previously and a pointer with the value "0" to which the information block of a "member name" corresponds is created.

[0052] Moreover, by the same technique, since it is the item which the "fan" of the main table should display on a table (view), the new information block a "ticket fan" is generated also about the information block of the "fan" concerned (refer to drawing 29 (b)). Thus, after the

pointer array of the value list of main table sides is generated, the pointer array of the value list of \*\* table sides is generated (Step 2205). This is processing for the \*\* table side to also display the item value corresponding to this according to an item value carrying out a multiple-times appearance at the main table side. As shown more in details at drawing 27, it is related with the record number by the side of a certain main table after initialization (Step 2701) of a record number. The pointer value of the position (line) corresponding to the record number concerned is referred to during the pointer array to the value list of information blocks shared at the main table side concerned (Step 2702). Subsequently, the number array of accumulating totals and starting position array which were created by sorting (refer to Step 2203) of the \*\* table are found out, and the number of accumulating totals and starting position of a position (line) which are shown with the above-mentioned pointer value are referred to (Step 2703). Here, in the record-number array (refer to the sign 2401 of drawing 24), i.e., the sorting array, after sorting, it can find out, respectively the record number of the number only of which relates to the record number of the main table from which position from the number of accumulating totals, and a starting position. That is, in accordance with the position which shows the above-mentioned position to the number of accumulating totals, the number of the above is in agreement with the difference of a starting position and the number of accumulating totals.

[0053] Therefore, according to the number of accumulating totals and starting position which were referred to at Step 2703, a record number is taken out and it sets to the pointer array to the value list of [ in the information block equipped with the item which should be displayed in the joined table (view) ]. The pointer value which each record number shows is taken out, and it is arranged in order as a new pointer array (Step 2703). It means that what should originate in the main table by this among the information block groups which should be joined had completed the creation.

[0054] Since the pointer value of the corresponding position (the 1st line) under pointer array of the value list which is in the information block of a "fan" about a record number "0" is "0" in drawing 28, In the information block by the side of the \*\* table which performed sorting application (information block of a "professional baseball team"), the number of accumulating totals "0" and starting position "2" of a position (the 1st line) corresponding to the above-mentioned pointer value "0" are taken out. With these values, he can understand that the record number "1" of "2-0=2" individual and "3" are the record numbers of the \*\* table relevant to the record number "0" of the main table from the position (the 1st line) corresponding to "0" in the set after sorting (sorting array). Therefore, the inside of the information block of the "game day" which is the item which should be displayed on a table (view) by the \*\* table side, The pointer value "0" of the position (the 2nd line and the 4th line) which a record number "1" and "3" show, and "1" are taken out one by one, and are arranged as a new pointer at the

value list of information blocks of "the ticket and game day" which is the joined information block for tables (view). In addition, the value list included in the information block of this "ticket and game day" is as common as the value list included in the information block of the "game day" in a \*\* table.

[0055] Similarly, since the pointer value of the corresponding position (the 2nd line) under pointer array of the value list which is in the information block of a "fan" about a record number "1" is "2", the number of accumulating totals "3" and starting position "4" of a position (the 3rd line) where the information block of a "professional baseball team" corresponds are taken out. Thereby in the set after sorting (sorting array), he can understand that the record number "0" of "3-2=1" individual is a record number of the \*\* table corresponding to the record number "1" of the main table from the position (the 4th line) corresponding to the number of accumulating totals "2." Therefore, it sets to the pointer array to the value list of [ in the information block of a "game day" ]. The pointer value "0" of the position (the 1st line) which a record number shows is taken out, and this is arranged following on the pointer (pointer made corresponding to the record number "0" of the main table) made previously as a pointer to the value list included in the information block of "a ticket and a game day."

[0056] Drawing 29 is the figure which was obtained by the processing mentioned above and in which showing the information block for creation of the joined table (view). Drawing 29 (a) and (b) are created by the processing shown in drawing 25 based on the information block by the side of the main table, and drawing 29 (c) is created by the processing shown in drawing 27 based on the information block by the side of a \*\* table. It can respond to the item value which overlaps and appears in each information block by processing mentioned above. Therefore, it becomes possible to acquire the item value which should be shown in a table (view) by taking out the item value shown with the pointer value of a value list sequentially from a head (the 1st line). An imagination array (record-number array to which it was extended for the view) is made, and this means that the item value is acquired based on the pointer value under pointer array which corresponds for every record number. For example, since corresponding pointer value [ in / about a head (the 1st line) / the pointer array of the information block of "a ticket and a member" ] is "2", you should display an item value "Tanaka" -- \*\* -- [ it can determine, and / pointer value ] since the corresponding pointer value in the pointer array of the information block of a "ticket fan" is "0" you should display an item value "A team" -- \*\* -- it can determine, and since the corresponding pointer value in the pointer array of the information block of "a ticket and a game day" is "0", it should display an item value "5/10" -- \*\* -- it can determine.

[0057] In the form of this operation, as explained to details above, when joining two tables, the table on which the default sort order of the table (view) outputted is reflected was defined as the "main table", and the near table of another side is defined as the "\*\*\* table." Moreover, in

both tables, after sharing the value list of [ in an information block ], based on the information block including the shared value list of \*\* table sides, the record number by the side of a \*\* table is sorted. That is, it sorts by the link item of a \*\* table. Subsequently, based on the number of accumulating totals and the final starting position of each item value acquired by said sorting in the pointer array in consideration of duplication by "\*\*:\*\*", it generates by getting to know the multiplicity about the both sides of the main table and a \*\* table. Then, it becomes possible to obtain a suitable view by taking out the item value which counters based on the conversion array (imagination record number) in consideration of duplication.

[0058] Thus, if the information block (for example, "the ticket and member" in drawing 29 , a "ticket fan", and the information block of "a ticket and a game day") for creating a table (view) is created Single or the thing under value list for which the search, the total, or sorting using two or more items can be made easy is clear by preparing the class number array, presence number array, and starting position array which were explained to each information block with reference to drawing 4 (b), (c), etc. In this case, what is necessary is just to use the above "conversion array (imagination record number)" with the form of this operation instead, although the "record number" was used in what was explained about drawing 4 etc.

[0059] Next, explanation is added per form of operation of the 5th of this invention. Also in the form of the 5th operation, although the join about the type of "\*\*:\*\*" is realized, memory space required of the main table and/or \*\* table side is reduced. First, explanation is added per reduction technique of the memory space by the side of the main table. If Step 2504 and drawing 26 of drawing 25 are referred to, it will set on a \*\* table. It is computed whether about the record number of the main table, the item value in the information block including the shared value list overlaps how many times, and appears, and by this [ the main table side ] The pointer array to the value list extended in each information block of the item which should be expressed in a table (view) is generated. By the way, since the pointer is extended according to the multiplicity by the side of a \*\* table, the multiplicity is common to each record number in the main table. For example, if its attention is paid to the pointer value under pointer array to the value list in both information blocks as shown in drawing 29 (a) and (b), the pointer value of the 1st line and the 2nd line is common. Similarly the 4th line and the 5th line are common. These are common according to the multiplicity by the side of a \*\* table, and it becomes unnecessary to prepare the pointer array to the value list of [ in each information block ] by preparing one array which took the above-mentioned multiplicity into consideration to the main table side.

[0060] Drawing 30 is a figure for explaining the conversion array (imagination record number) prepared in the main table side. If such a conversion array is made so that clearly from drawing 30 , it will become possible about the main table side to acquire the same view item as drawing 29 . Such a conversion array may be generated by changing processing of Step 2504

of drawing 25 a little. That is, the number array of accumulating totals of an information block and starting position array by the side of a \*\* table which were sorted can be reached by passing through the pointer value under pointer array corresponding to the record number of the main table. The multiplicity of a record number can be obtained by computing the difference of the starting position and the number of accumulating totals corresponding to the above-mentioned record number here. Then, it becomes possible to obtain the new conversion array that only the number of duplications repeats a record number. With the form of this operation, he can understand that it is not necessary to actually create an imagination information block (the sign 3001 of drawing 30 , 3002 references). That is, it becomes possible by referring to the pointer array to the value list of information blocks by the side of the main table to obtain the pointer array to the value list of imagination information blocks at every table (view) creation by making only the conversion array which is an imagination record. Therefore, a conversion array is created to the main table side, and it becomes generable [ the table (view) joined only by holding this ].

**CONTINUE**

For further translation, please click on the above button.  
The current translation will be overwritten when you continue.

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[Translation done.]